

U.S. Patent Application Serial No. 10/539,747
Response filed February 25, 2009
Reply to OA dated December 3, 2008

AMENDMENTS TO THE CLAIMS:

Please amend claim 1, as follows. This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (Currently amended): A gas-liquid separator for gas-liquid separation performed by centrifugal force of an impeller mounted on a shaft which rotates in a casing comprising:

a discharge impeller part providing discharge force to the passing fluid formed on an axial end of the impeller; a discharge outlet of the casing disposed in a position opposite the discharge impeller part;

the other axial end of the impeller being ~~formed~~ positioned with clearance from the inner wall of the casing so as to slide on the inner wall of the casing;

an exhaust outlet of the casing disposed in a position opposite the sliding impeller part; vacuum means connected to the exhaust outlet; and

a suction inlet of the casing disposed in a position between the discharge outlet and the exhaust outlet.

Claim 2 (Original): The gas-liquid separator according to claim 1, wherein a cleaning fluid inlet is provided near the shaft sealing of the casing where the rotating shaft penetrates.

Claim 3 (Previously presented): The gas-liquid separator according to claim 1, wherein the inlet to the casing is formed in a flow path that winds up inside the casing.

Claim 4 (Previously presented): The gas-liquid separator according to claim 2, wherein the inlet to the casing is formed in a flow path that winds up inside the casing.

Claim 5 (Previously presented): The gas-liquid separator according to claim 1, wherein the impeller is provided with a baffle member which prevents the direct penetration of liquid near the rotating shaft to the exhaust outlet.

Claim 6 (Previously presented): The gas-liquid separator according to claim 2, wherein the impeller is provided with a baffle member which prevents the direct penetration of liquid near the rotating shaft to the exhaust outlet.

Claim 7 (Previously presented): The gas-liquid separator according to claim 1, wherein the impeller is provided with at least one cylindrical member coaxially attached to the impeller.

Claim 8 (Previously presented): The gas-liquid separator according to claim 2, wherein the impeller is provided with at least one cylindrical member coaxially attached to the impeller.

Claim 9 (Previously presented): The gas-liquid separator according to claim 1, wherein at least one of fluid throttle means, heating means, and accumulation means is inserted in the passage of the suction inlet.

Claim 10 (Previously presented): The gas-liquid separator according to claim 2, wherein at least one of fluid throttle means, heating means, and accumulation means is inserted in the passage of the suction inlet.

Claim 11 (Previously presented): The gas-liquid separator according to claim 7, wherein at least one of fluid throttle means, heating means, and accumulation means is inserted in the passage of the suction inlet.

Claim 12 (Previously presented): The gas-liquid separator according to claim 1, wherein cavitation causing means is inserted in the passage for gas-liquid separation.

Claim 13 (Previously presented): The gas-liquid separator according to claim 2, wherein cavitation causing means is inserted in the passage for gas-liquid separation.

Claim 14 (Previously presented): The gas-liquid separator according to claim 7, wherein cavitation causing means is inserted in the passage for gas-liquid separation.

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Claim 15 (Previously presented): The gas-liquid separator according to claim 1, wherein protection means, which allows gas passage but prevents liquid passage, is inserted in the exhaust passage from the exhaust outlet to the vacuum means.

Claim 16 (Previously presented): The gas- liquid separator according to claim 2, wherein protection means, which allows gas passage but prevents liquid passage, is inserted in the exhaust passage from the exhaust outlet to the vacuum means.

Claim 17 (Previously presented): The gas-liquid separator according to claim 7, wherein protection means, which allows gas passage but prevents liquid passage, is inserted in the exhaust passage from the exhaust outlet to the vacuum means.

Claim 18 (Previously presented): The gas-liquid separator according to claim 1, wherein at least a portion of the discharged fluid from the discharge outlet is returned to the suction inlet.

Claim 19 (Previously presented): The gas-liquid separator according to claim 2, wherein at least a portion of the discharged fluid from the discharge outlet is returned to the suction inlet.

Claim 20 (Previously presented): The gas-liquid separator according to claim 7, wherein at least a portion of the discharged fluid from the discharge outlet is returned to the suction inlet.